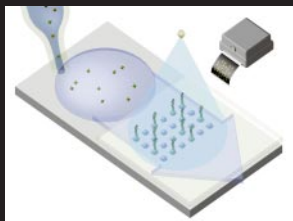
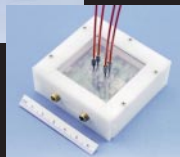
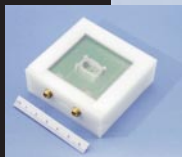


# Microtechnology Research and Bioengineering Instrumentation Group

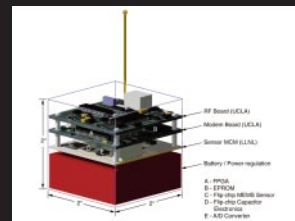
The members of the Microtechnology Research and Bioinstrumentation Group represent a large skill set vital to the success of many programmatic efforts. The group is the primary interface between Mechanical Engineering and the Center for Microtechnology, and it supports a wide variety of activities in Nonproliferation, Arms Control, & International Security (NAI), Environmental Protection Department (EPD), Biology & Biotechnology Research Program (BBRP), and the Medical Technologies Program (MTP). The members combine years of experience in instrument design with the techniques of microfabrication, and are in a unique position to design the next generation of compact chemical and biological sensors.



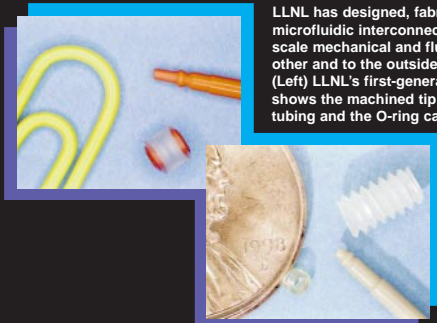
Design concept of an imaging cytometric BW agent immunoassay sensor. A sample is injected at left and carried to the sensor region, where analytes bind with antibody-labeled beads. Fluorescent hits are read out on a CCD camera.



Through a collaborative effort with the University of Texas MD Anderson Cancer Center, LLNL has designed custom packaging for instruments which incorporate both electronic and fluidic components. Images show an exploded assembly and the top and bottom views of a miniature particle impedance sensor.



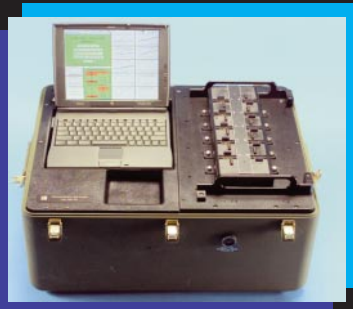
Miniature, low-power, wireless microsensor modules will be used where self-configuring distributed sensor networks might be needed, such as for large structure monitoring or covert surveillance.



LLNL has designed, fabricated, and tested microfluidic interconnects to interface micron-scale mechanical and fluidic structures to each other and to the outside, macroscopic world. (Left) LLNL's first-generation snap connector shows the machined tip of standard HPLC tubing and the O-ring cartridge. (Right) The second-generation snap connector incorporates a polyurethane molded ring and a modified set-screw.



Portable thin-layer chromatography kit allows inexpensive field analysis of suspect compounds.



ANAA (Advanced Nucleic-Acid Analyzer) is a 10-chamber thermal cycling system that is capable of performing the polymerase chain reaction (PCR). The system is capable of rapid detection and identification of biological agents in the field.